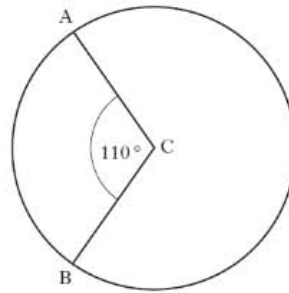


National 5 Revision B Paper 2
Based on Int 2 2012

1. The diagram below shows a circle, centre C.

The circumference of the circle is 40.8 centimetres.
Calculate the length of the minor arc AB.



2

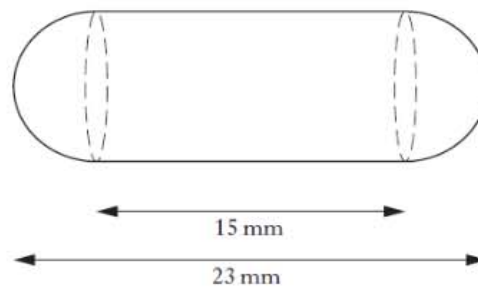
2. Multiply out the brackets and collect like terms.

$$(3x - 5)(x^2 + 2x - 6)$$

3

3. A health food shop produces cod liver oil capsules for its customers.

Each capsule is in the shape of a cylinder with hemispherical ends as shown in the diagram below.



The total length of the capsule is 23 millimetres and the length of the cylinder is 15 millimetres.

4

Calculate the volume of one cod liver oil capsule.

4. Solve the equation

$$3x^2 + 7x - 5 = 0,$$

4

giving the roots correct to one decimal place.

5. A ten-pin bowling team recorded the following six scores in a match.

134 102 127 98 104 131

(a) For this sample calculate:

- (i) the mean;
- (ii) the standard deviation.

Show clearly all your working.

4

In their second match their six scores have a mean of 116 and a standard deviation of 12.2.

(b) Consider the 5 statements written below.

- 1 The total of the scores is the same in both matches.
- 2 The total of the scores is greater in the first match.
- 3 The total of the scores is greater in the second match.
- 4 In the first match the scores are more spread out.
- 5 In the second match the scores are more spread out.

Which of these statements is/are true?

2

6. Three groups are booking a holiday. The first group consists of 6 adults and 2 children. The total cost of their holiday is £3148.

Let x pounds be the cost for an adult and y pounds be the cost for a child.

- (a) Write down an equation in x and y which satisfies the above information. 1

The second group books the same holiday for 5 adults and 3 children. The total cost of their holiday is £3022.

- (b) Write down a second equation in x and y which satisfies this information. 1

- (c) The third group books the same holiday for 2 adults and 4 children. The travel agent calculates that the total cost is £2056.

Has this group been overcharged?

Justify your answer. 4

7. Express as a single fraction

$$\frac{a}{b} + \frac{b}{a}, \quad a \neq 0, \quad b \neq 0. \quad \text{2}$$

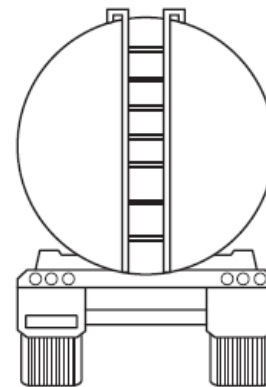
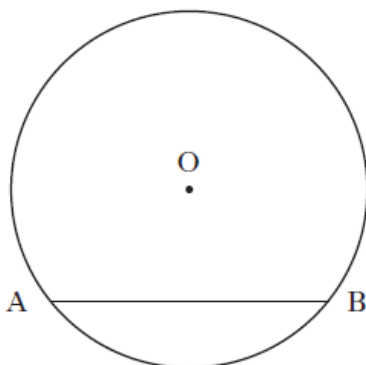
8. Solve the equation $5 \cos x^\circ - 3 = 1$, $0 \leq x \leq 360$. 3

9. A formula used to calculate lighting efficiency is 3

$$E = \frac{I}{D^2}.$$

10. A tanker delivers oil to garages.

The tank has a circular cross-section as shown in the diagram below.



↑
↓
Depth of oil

The radius of the circle, centre O , is 1.9 metres.

The width of the surface of the oil, represented by AB in the diagram, is 2.2 metres.

Calculate the depth of the oil in the tanker. 4

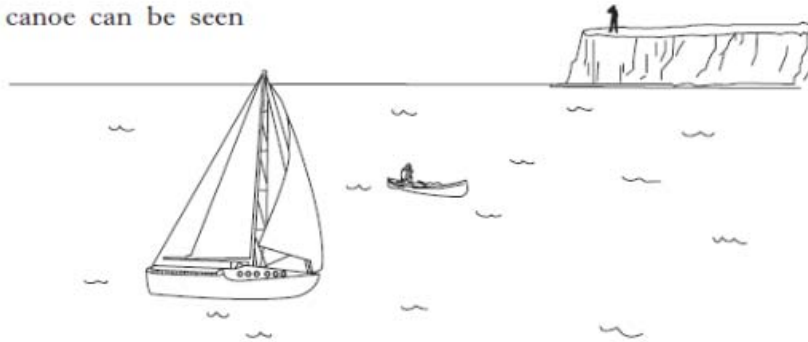
11. Simplify, expressing your answer with positive indices.

2

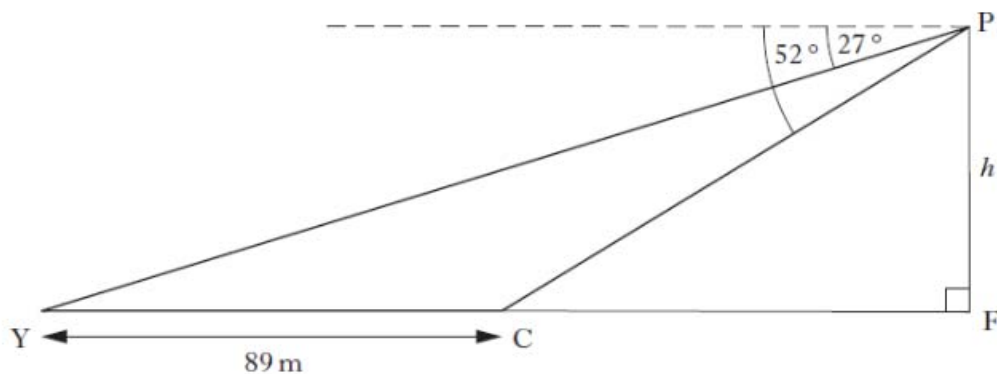
$$(x^2 y^4) \div (x^{-3} y^6)$$

12.

A yacht and a canoe can be seen from a clifftop.



In the diagram below, Y and C represent the positions of the yacht and the canoe.



5

From a point P on the clifftop:

- the angle of depression of the yacht is 27° ;
- the angle of depression of the canoe is 52° .

The distance between the yacht and the canoe is 89 metres.

Calculate the height, h , metres, of the cliff.

13. Due to the threat of global warming, scientists recommended in 2010 that the emissions of greenhouse gases should be reduced by 50% by the year 2050.



The government decided to reduce the emissions of greenhouse gases by 15% **every ten years**, starting in the year 2010.

4

Will the scientists' recommendations have been achieved by 2050?

You must give a reason for your answer.

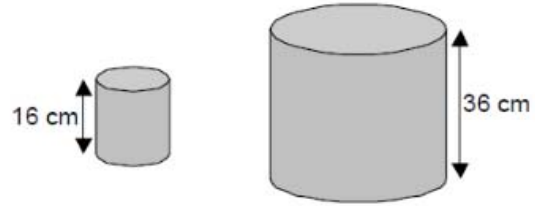
14. Simplify $\frac{\cos x^\circ \tan x^\circ}{\sin x^\circ}$.

2

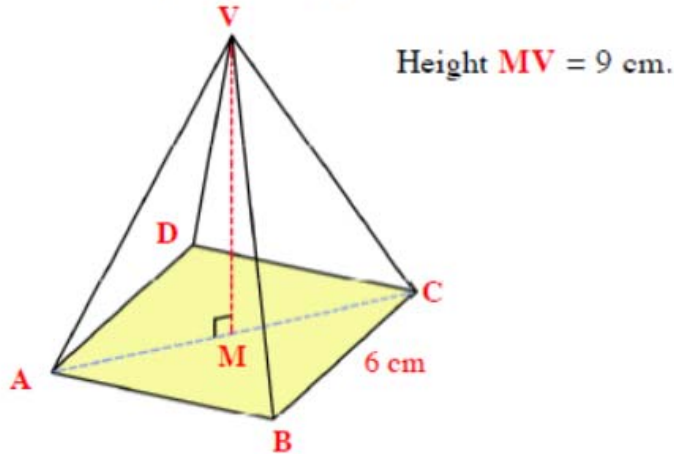
Extra Questions

15. Two cylinders are mathematically similar. The smaller cylinder is made from 800 cm^2 of aluminium.

What area of aluminium is needed to make the larger cylinder.

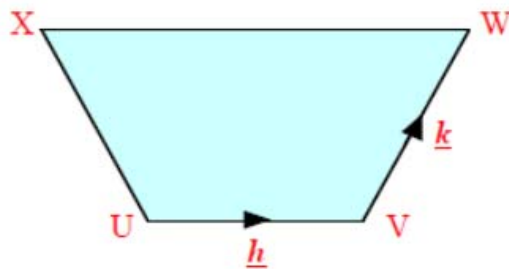


16. Shown is a square based pyramid **ABCDV**.



- Calculate the length of the diagonal **AC**.
- Write down the length of **AM**.
- Calculate the length of the sloping edge **AV**.

17. Trapezium **UVWX** has **UV** parallel to **WX** and **XW** = $2 \times \text{UV}$ in length. $\overline{UV} = \underline{h}$ and $\overline{VW} = \underline{k}$.



- Find these vectors in terms of \underline{h} and \underline{k} :-
 - \overline{XW}
 - \overline{UW}
 - \overline{VX}
 - \overline{UX} .

In fact, $\underline{h} = \begin{pmatrix} 4 \\ 0 \end{pmatrix}$ and $\underline{k} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$.

- Find the components of \overline{XW} , \overline{UW} & \overline{UX} .
- Find $|\overline{VW}|$, $|\overline{UW}|$ & $|\overline{VX}|$ in surd form.